

Remarks

The Applicants have amended Claim 10 to recite that at least one of the diverters which connect element and safety electronics consists of nickel-coated copper foil with a nickel layer thickness of 10 nm to 3 μm . Support may be found in Claim 18, which has been cancelled.

Claims 10 – 19 stand rejected under 35 USC §103 over the hypothetical combination of Hirai with Takahashi. The Applicants respectfully submit that the rejection is now moot with respect to cancelled Claim 18. The Applicants nonetheless respectfully submit that the subject matter of Claims 10 – 17 and 19 is non-obvious over that hypothetical combination. Reasons are set forth below.

Before specifically addressing the hypothetical combination of Hirai with Takahashi, the Applicants provide initial comments highlighting advantageous features of the claimed subject matter. In that regard, the Applicants' Specification teaches that it is generally advantageous to use diverters made of pure nickel to improve corrosion resistance. However, the Applicants discovered several things. The Applicants discovered that diverters consisting of pure nickel are less conductive than diverters consisting of copper. The Applicants specifically found that strong currents applied to nickel diverters cause them to heat rather easily. This can be a problem.

In the case of electrochemical elements having a housing comprising of flexible film material such as recited in Claim 10, it is possible that the flexible film material may be softened or even melt by the heat generated in such nickel diverters and, as a consequence, the housing may be damaged. The Applicants discovered that these problems can be avoided by utilizing copper diverters that have only a nickel coating as recited in Claim 10. The Applicants further discovered that the nickel coating must not be too thick and should not exceed the Applicants' nickel layer thickness of 3 μm as recited in Claim 10.

Turning now to Takahashi and the rejection, the Applicants note with appreciation the Examiner's frank acknowledgement that Takahashi does not disclose nickel coated copper foil. The Applicants agree. Thus, the rejection turns to Hirai for the teachings of nickel plated copper electrodes and points to Paragraph [0033] and Claim 1 of Hirai.

The Applicants have carefully considered Paragraph [0033] in Hirai, as well as Claim 1. Claim 1 provides important context to the disclosure of Paragraph [0033]. This thus caused the Applicants to more carefully consider the balance of the Hirai disclosure, particularly in various of the following paragraphs subsequent to Paragraph [0033]. In that regard, Paragraph [0035] is particularly instructive as it provides additional specific teachings and refers those skilled in the art to Fig. 1(c).

Returning first to Paragraph [0033], Hirai discloses a terminal having a thickness of 8 μm to 5 mm, a width from 4 to 20 mm being made of aluminum (Al), copper (Cu) (including nickel-plated Cu) or nickel (Ni). Then, Claim 1 puts that disclosure into further context which refers to a copper member for a battery and has a composite covering layer comprising an aminated phenol polymer, a trivalent chromium compound and a phosphorus compound formed on the surface of a foil-shaped, sheet-shaped or plate-shaped copper member. In other words, Claim 1 provides the further context that the raw metallic plate is actually covered with additional materials.

The specifics of this context are provided subsequent to Paragraph [0033] such as in Paragraph [0035]. In that regard, Paragraph [0035] teaches that the copper members mentioned in Paragraph [0033] are formed into a composite by utilizing a covering layer which is applied after applying a pretreatment onto the surface of the copper member. Paragraph [0035] refers those skilled in the art to Fig. 1(c) to appreciate the resulting composite terminal member.

Later portions of the right hand column of Page 2 and both columns of Page 3 provide additional disclosure as to how the composite covering layer is formed and what it is formed from. Paragraph [0041] is particularly instructive. It recites that the composite covering layer is provided for the purpose of firmly bonding the copper member such as the copper foil or the copper sheet and the metal bonding resin and protecting the surface of the copper member from the electrolyte or hydrofluoric acid generated from hydrolysis of the electrolyte.

The Applicants, therefore, respectfully submit that what Hirai actually discloses when taken as a whole is that members made of aluminum copper (including nickel-plated copper) or nickel are subjected to pretreatment and then formed into a composite which is utilized in connection with the electrodes and the safety electronics. The Applicants, therefore, respectfully submit that if one skilled in the art were to look to Hirai and then hypothetically combine the teachings of Hirai with Takahashi, the result would be a terminal made from aluminum, copper (including copper-plated copper) or nickel that has been pretreated and then coated to form a composite layer member. That composite member would then be applied to the Takahashi structure.

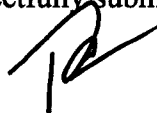
The problem with such a combination is that such a combination is different from what the Applicants specifically claim in Claim 10 wherein they recite a voltaic element wherein at least one of the diverters which connect element and safety electronics consists of nickel-coated copper foil with a nickel layer thickness of 10 nm to 3 μm . The Applicants exclude such a composite layer from their diverters. Thus, what the Applicants claim when compared to the product resulting from the combination of Hirai with Takahashi is completely different. The Applicants, therefore, respectfully submit that the hypothetical combination of Hirai with Takahashi against Claims 10 – 17 and 19 would result in a different structure from that claimed. Withdrawal of the rejection on this basis alone is respectfully requested.

However, there is more. As noted above, the Applicants' Claim 10 recites that the nickel layer thickness is 10 nm to 3 μm . This is not disclosed, not taught and not suggested by Hirai. The Applicants respectfully submit that it is an error in the rejection of (now cancelled) Claim 18 that "since the plating thickness is extremely small compared to the thickness of the base metal itself, the Examiner considers that it meets the claim limitation." The relative plating thickness is completely irrelevant to whether it meets the claim limitation. There simply is no disclosure of the thickness of the nickel plating in Hirai. The relative thickness of the nickel layer relative to the thickness of the copper foil is utterly irrelevant with respect to §103. The fact is that the Applicants' Claim 10 specifies a nickel layer at a thickness of 10 nm to 3 μm . This specific language cannot be dismissed simply because the relative thicknesses are "extremely small" in comparison.

The Applicants discovered that while the presence of the nickel layer is important with respect to improving corrosion resistance, there should not be too much nickel present otherwise the previously discovered dangers of warming or heating will occur. As a consequence, the Applicants deliberately keep the thickness of the nickel coating small relative to the thickness of the copper foil. Hence, it is important to the Applicants to have that "extremely small" relative thickness and this important claimed feature cannot simply be ignored. The feature is specifically claimed on the one hand and is not disclosed by Takahashi or Hirai on the other hand. Thus, if the two (2) publications are hypothetically combined, one skilled in the art would have no idea what the thickness of the nickel layer is and, as a consequence, that combination is non-enabling with respect to Claim 10. Withdrawal of the rejection is respectfully requested.

In light of the foregoing, the Applicants respectfully submit that the entire Application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to be 'T. Daniel Christenbury', written over the typed name.

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